

Adaptive mechanisms of plants against salt stress and salt shock

ABSTRACT

Salinization process occurs when soil is contaminated with salt, which consequently influences plant growth and development leading to reduction in yield of many food crops. Responding to a higher salt concentration than the normal range can result in plant developing complex physiological traits and activation of stress-related genes and metabolic pathways. Many studies have been carried out by different research groups to understand adaptive mechanism in many plant species towards salinity stress. However, different methods of sodium chloride (NaCl) applications definitely give different responses and adaptive mechanisms towards the increase in salinity. Gradual increase in NaCl application causes the plant to have salt stress or osmotic stress, while single step and high concentration of NaCl may result in salt shock or osmotic shock. Osmotic shock can cause cell plasmolysis and leakage of osmolytes in plant. Also, the gene expression pattern is influenced by the type of methods used in increasing the salinity. Therefore, this chapter discusses the adaptive mechanism in plant responding to both types of salinity increment, which include the morphological changes of plant roots and aerial parts, involvement of signalling molecules in stress perception and regulatory networks and production of osmolyte and osmoprotective proteins.

Keyword: Adaptive mechanisms; Ionic stress; Osmotic stress; Salt stress; Salt shock